Analysis with the Mini

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- **The Mini in General**
- **Comparing the Mini to the Micro for Analysis**
- **Known Problems and Bugs**
- **Development Schedule**
- **Conclusions**

The Mini

- Stores detailed detector information
  - Tracking hits, Dirc hits, Emc crystals, …
- Supports a detailed event display (wired)
  - Scanning is a physics analysis tool
- Supports detailed detector studies
- Supports offline detector calibration
  - Svt local alignment, Dch dE/dx, Dch T-to-D, …
- Supports *Detailed Analysis*
  - Study systematic effects of conditions errors, algorithm changes, detector imperfections,…
- Supports Analysis
  - BetaMini provides a Micro-compatible interface
- Is larger than the Micro
  - 6.5KBytes/event vs ~2KBytes/event (compressed)

Mini

- **Stores Reco Objects**
  - **TrkRecoTrk, EmcCand,…**
  - **BtaCandidates are made using a ‘Loader’ module**
    - XxxQual are created by BtaMiniMicroAdapter
- **Data can be read at several *Levels of Detail***
  - **Refit (Detailed analysis)**
    - Refit tracks from hits, …
    - Can follow conditions changes (alignment, …)
    - Can read events at ~5 Hz
  - **Cache (Analysis)**
    - Read ‘fit’ parameters directly
      - Tracks, PID consistency, …
    - Can read events at ~20 Hz

Micro

- **Stores BtaCandidates**
  - **‘4-vectors’, XxxQual,…**
    - No link back to reco objects
  - **BtaCandidates are read directly**
    - XxxQual are read directly
- **Data are read as stored**

Mini

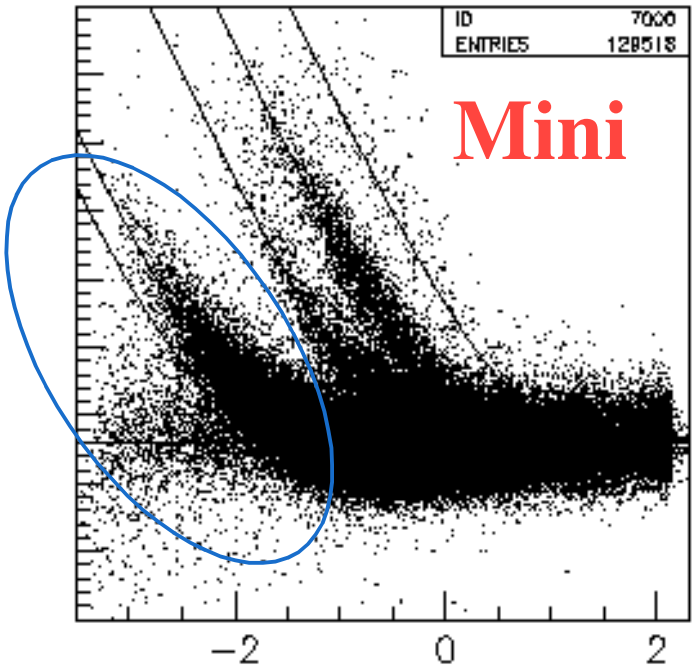
- All ‘5’ track fit mass hypos are stored
  - ‘Correct’ P at the origin due to dE/dx
  - ‘Correct’ χ^2 due to dE/dx and scattering
- Track fits can be extended into the detector
  - Using the reco Kalman fit
  - $\pi^\pm$ from K_s decays outside the beampipe have ‘correct’ momentum
- All Emc cluster moments can be computed

Micro

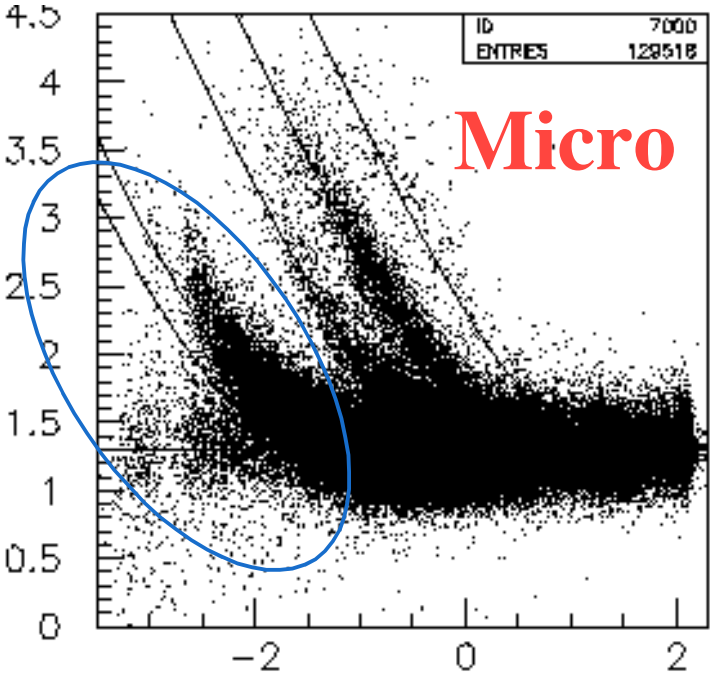
- Only the π mass track fit hypo is stored
- Only the track parameters at the origin are stored
- Only some Emc cluster moments are stored

SVT dE/dx

- **Momentum for SVT dE/dx is now calculated at layer 3**
  - **Improves Slow Pion identification**
- **Not stored on the Micro**
  - **Consistencies are right, *expected* dE/dx value is wrong**
- **Stored correctly on the Mini**



ln(dE/dx) vs ln(Momentum)



ln(dE/dx) vs ln(Momentum)

Plots by G. Lynch

Known Problems

- **Calorimeter information (CalQual) was missing on track-based BtaCandidates**
  - **Fixed in 12.3.4**
- **Track refit (refit mode) fails for ~1 in 10^3 tracks**
  - **Albedo tracks in the Dch**
- **Readback performance is not as good as the Micro**
  - **BtaMicro adapter is not natural to the Mini**
  - **BtaCandidate is not optimized for the Mini**
- **The complete Mini is only available for 12-series production data (just starting)**

Development Schedule

- **Persistent composites (end of 2002)**
  - **Store composites (daughters + vertexer + constraints) to avoid rerunning combinatorics (G. Finocchiaro)**
- **Reduced Minis (end of October)**
  - **Store only user-selected lists of candidates**
  - **Selectively remove hit-level data ('cache' data only)**
    - Reduces output size by a factor of ~3
  - **Can be used for making private skims**
- **BetaMini performance optimization (Spring 2003)**
  - **Redesign Beta around the Mini (J. Tinslay, A. Mohktarani)**
  - **Expect to achieve read rates of ~100Hz**
- **Port of the Mini to Kanga (Root IO) file format**
  - **Has been investigated, no showstoppers**

Conclusions

- **The Mini is ready for use**
  - **Basic functionality is supported**
  - **12-series data will soon start to appear**
  - **Needs more ‘field testing’**
- **The Mini supports important analysis functions currently missing at BaBar**
  - **Event display, detailed analysis, multiple mass hypos, …**
- **The Full Mini is too large to be the primary analysis format of BaBar**
  - **A Reduced Mini might satisfy BaBar’s constraints**